Reliability of capture the olive fly *Bactrocera oleae* (Rossi 1790) on yellow plates using visual data processing techniques

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Summary

Food production is increasingly preoccupied with precision agriculture. One of its solutions are visual data processing technologies - object detection (OD), combined with the development and application of artificial intelligence (AI) models. These technologies as a tool are much more precise than looking with the "naked eye". The olive fly *Bactrocera oleae* (Rossi 1790) is an economic pest of the olive fruit that appears regularly in the Mediterranean climate, but the capture is not the same every year. Measuring the capture on the yellow plates, creating the flight curve is an extremely time-consuming job for olive growers. OD technologies, with the application of AI, speed up the process of measuring captures. The developed AI model bridges the spatial distance and travel time of the yellow plates. The aim of the paper is to show the development of the OD model for *B. oleae* and its reliability. The AI model was developed in Zadar County on visual samples of images of yellow plates from 6 localities collected from 2020 to 2022. The research was carried out as part of the project: SAN-KK.01.2.1.01.0100 (Smart agriculture network), financed by IRI- ERDF fund. AI model development was carried out using TensorFlow software. The concept used to determine the level of precision bio efficientdet lite4. This is an AI algorithm, and it works by having a separate set of images determine the quality of the model. With it, reliability of up to 95% was achieved. OD technologies, along with the development of AI models, have proven to be applicable in measuring the captures of adults and setting the flight curve of the olive fly. Technology further bridges distance and time to measure adult captures.

Keywords: annotation, artificial intelligence (AI), Mediterranean, object detection (OD), olive fly